A. G. HATHCOCK.

ROTARY INTERNAL COMBUSTION ENGINE.

APPLICATION FILED NOV. 10, 1910.

1,014,596.

Patented Jan. 9, 1912.

3 SHEETS—SHEET 1.

Fig. 1.

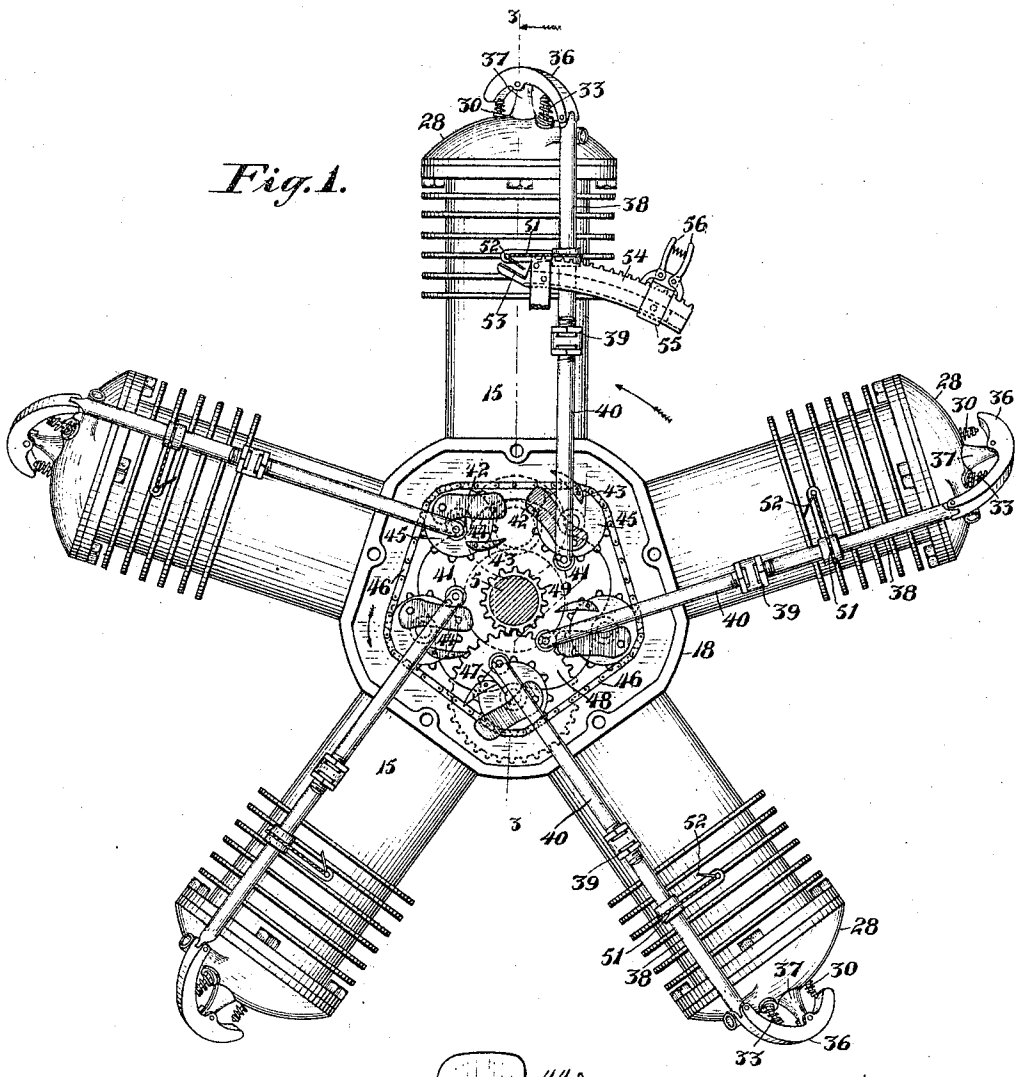
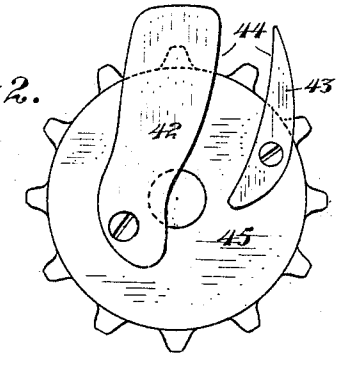


Fig. 2.



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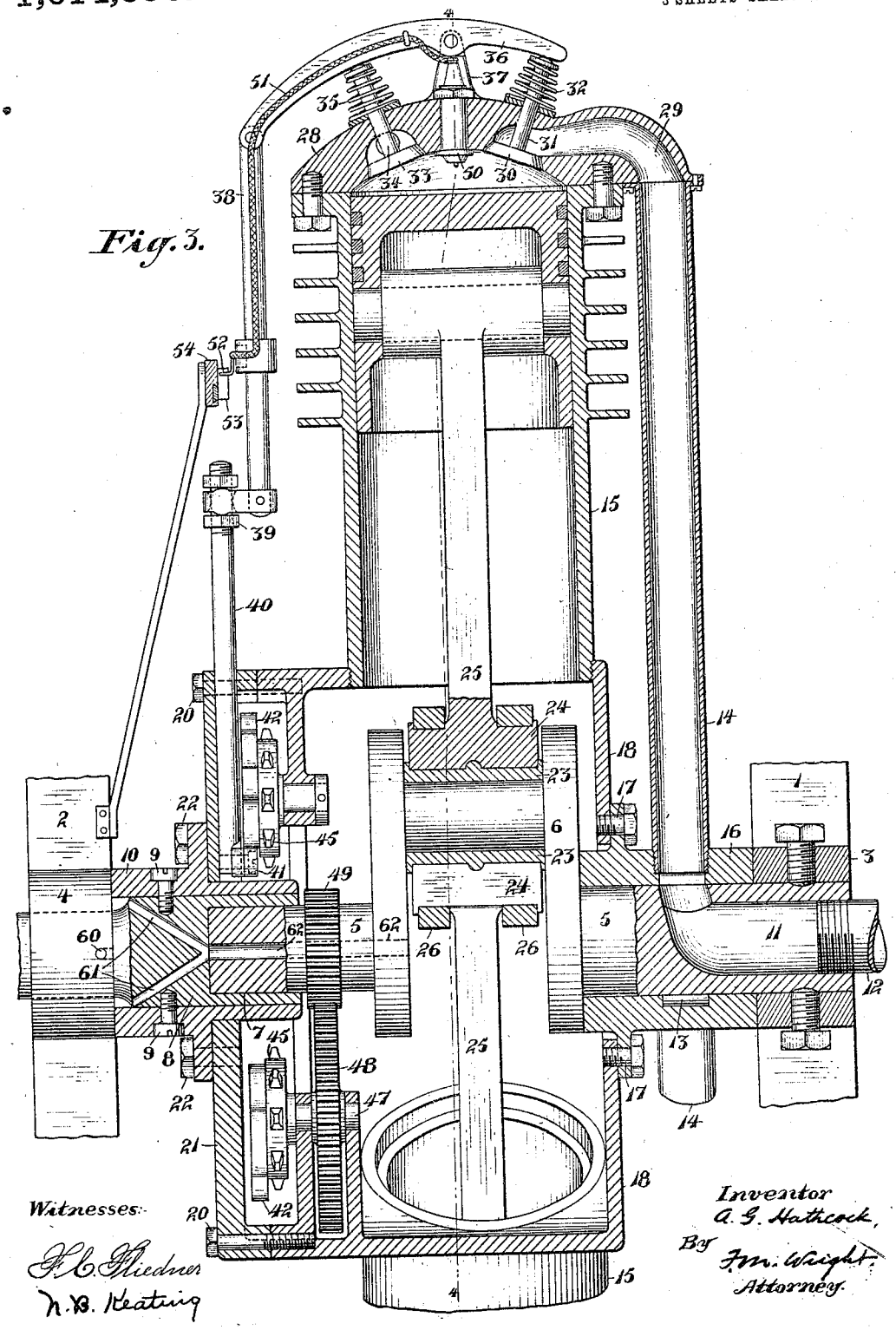
3 SHEETS—SHEET 2.

Fig. 3.



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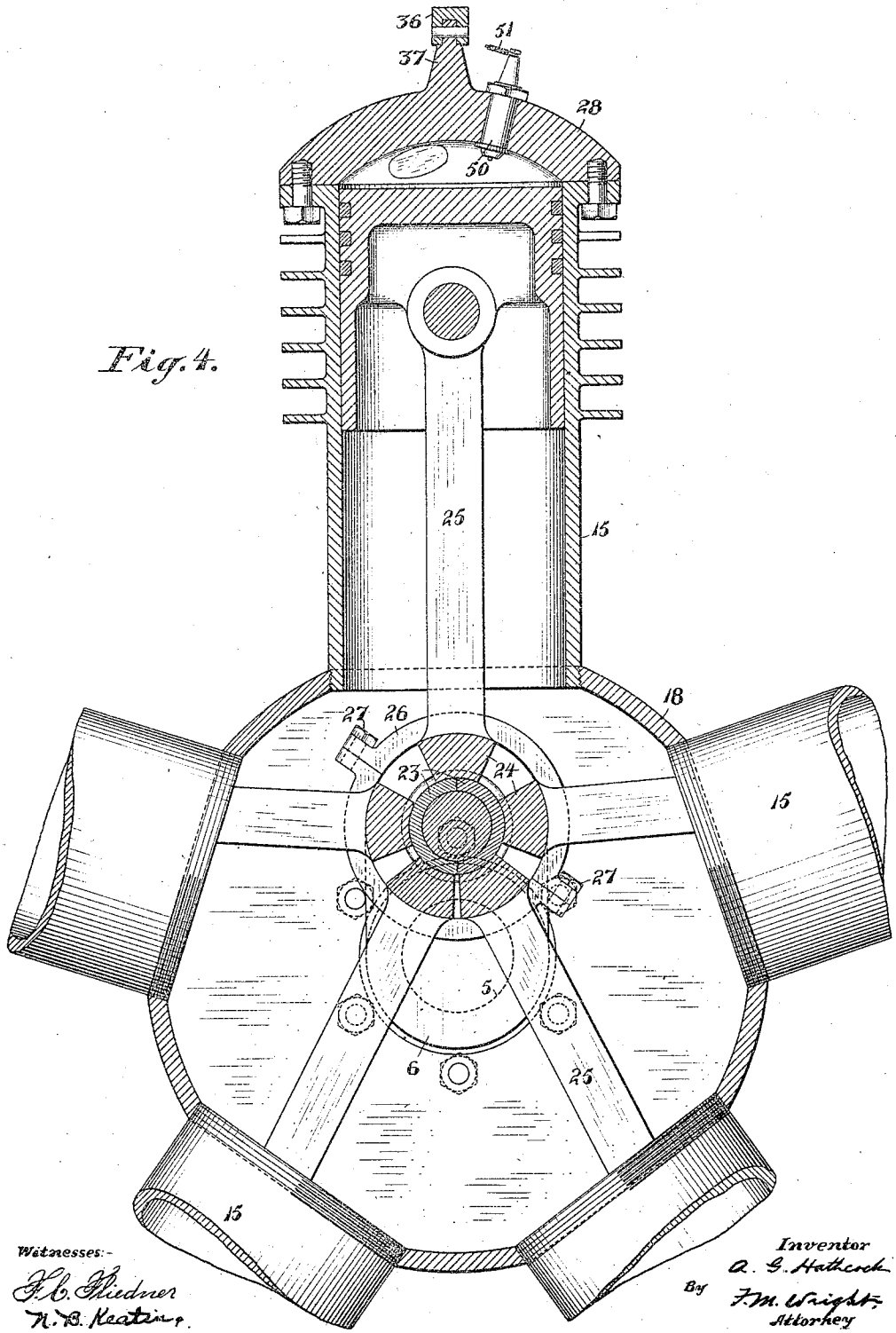
3 SHEETS—SHEET 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

ALIUS G. HATHCOCK, OF SAN FRANCISCO, CALIFORNIA.

ROTARY INTERNAL-COMBUSTION ENGINE.

1,014,596. Specification of Letters Patent. Patented Jan. 9, 1912.

Application filed November 10, 1910. Serial No. 591,575.

To all whom it may concern:

Be it known that I, ALIUS G. HATHCOCK, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in Rotary Internal-Combustion Engines, of which the following is a specification.

The present invention relates to rotary internal combustion engines in which the combustion cylinders rotate about a stationary shaft.

The object of the invention is to provide an engine of this character, which shall be simple in construction, and effective in operation.

In the accompanying drawings, Figure 1 is a side view of the engine, certain parts being shown in section; Fig. 2 is an enlarged side view of one of the cams and the parts immediately coöperating therewith; Fig. 3 is a section of the same on the line 3—3 of Fig. 1 on an enlarged scale; Fig. 4 is a section on the line 4—4 of Fig. 3.

Referring to the drawing, 1, 2, indicate supports for bearings 3, 4. Secured in the bearing 3 is one end of a stationary crank shaft 5 carrying a U-crank 6, the other end of said crank shaft being received within a socket 7 in a sleeve 8 which is secured by screws 9 to a sleeve 10 rotating in the other bearing 4. Into a recess 11 in the first named end of said crank shaft is inserted a fuel supply pipe 12, having its inner end rounded, and abutting against a correspondingly-formed portion of said crank shaft, to avoid the formation of eddies in the supply of fluid fuel. The fluid fuel issues from said recess in the crank shaft into a groove 13 around the shaft and from said groove it flows into fluid conduits 14, one for each internal combustion cylinder 15, of which there are preferably five in number, although there might be three or seven. The inlet end of each tube is secured within a sleeve 16, to which sleeve is also secured, as shown at 17, a casing 18, into which casing are screwed the inner ends of the internal combustion cylinders 15. Secured by screws 20 to the side of said casing remote from said sleeve is a cover 21 which in turn is secured by screws 22 to the sleeve 10. On the mediate part of said crank are secured two half bushings 23 and against said bushings press bearing blocks 24 formed on the end of piston rods 25, said blocks being held against said bushings by collar sections 26 secured together by screws 27.

The outlet end of each fuel supply tube is secured to the cylinder head 28 so as to be in register with a conduit 29 leading to the interior of said cylinder and at its end forming an inlet valve seat. Resting against said seat is an inlet valve 30 having a stem 31 pressed outward by a spring 32. Likewise formed in the head of each cylinder is an outlet valve 33 having a stem 34 adapted to be pressed to its seat by a spring 35. The inlet and outlet valves are controlled by levers 36 pivoted upon standards 37 located substantially midway between said sleeve stems, the outer end of each lever being pivoted to a rod 38 which is adjustably secured, as shown at 39, to a rod 40, which rods are actuated by cams pressing against rollers 41 upon the ends of the rods. Each cam consists of two parts or sections 42, 43, spaced from each other to form a cam groove 44 in which the roller 41 travels. Said cam sections are adjustably secured on a sprocket wheel 45, four of said sprocket wheels being driven by a sprocket chain 46 around the fifth sprocket wheel, which itself is mounted on the same shaft 47 as a gear wheel 48, which meshes with a stationary pinion 49 upon the shaft 5 of the machine. As the cylinders rotate, said gear wheel 48 rotating around the pinion 49, is given a movement of rotation relative to its center, and thus rotates the sprocket wheel 45 immediately connected thereto, and, by means of the sprocket chain, all the other sprocket wheels. It is in order to avoid having to depend upon the springs 32, 35, to return the rod 38 to its normal position but to positively actuate the same, that I provide for each cam a main cam section 42 and an auxiliary cam section 43. The auxiliary cam section engages the roller 41 and compels it to pass along the groove 44 and thereby insure a properly timed movement of the roller and therefore also of the inlet and outlet valves. The form of said cam is such that, in the rotation of the cylinders, it operates the corresponding rod and lever to, first, open the inlet valve and maintain it open for one cycle, that is, one-half of a revolution of the engine; it then closes it and maintains it closed for two cycles, or one whole revolution. It then immediately opens the exhaust

valve and maintains it open for one cycle, or one-half of a revolution of the engine, thus completing the four cycles.

The spark plug 50 is connected by a wire 51 which is guided along the lever 36, and the rod 38, and terminates in a platinum contact piece 52. This is adapted to close an electrical circuit by means of a contact 53, which is supported upon a rack 54, adjustably held by means of levers 56 on a stationarily supported arm 55. When the rod 40 is withdrawn toward the shaft 5, the contact piece 52 rotates without making contact; but when the rod is in its intermediate position, as shown in Fig. 3, the platinum contact piece 12 is adapted to contact, and upon the breaking of said circuit to produce a spark in the explosion chamber and ignite the combustible gases.

60, 61, 62 are oil conduits for lubricating the interior of the crank case.

I claim:—

1. The combination of a stationary crank shaft, a rotating crank case thereon, cylinders secured to said crank case, pistons in said cylinders, piston rods connected at their outer ends to said pistons and rotating at their inner ends about the crank case, inlet and outlet valves for said cylinders, levers for controlling said valves, rods for actuating said levers, cams arranged to successively impart similar motion to said rods, sprocket wheels secured to said cams, a sprocket chain engaging all of said wheels whereby the remainder of said sprocket wheels are driven from one of them, a gear wheel rotating with the latter sprocket wheel, and a pinion on the crank shaft rotating with said gear wheel, substantially as described.

2. In combination with a stationary crank shaft, a rotating crank case thereon, cylinders secured to said crank casing, pistons in said cylinders, piston rods connected at their outer ends to said pistons and rotating at their inner ends about said crank shaft, inlet and outlet valves for the respective cylinders, levers for controlling said valves, rods for actuating said levers, cams for actuating said rods, means for rotating all of said cams in unison, sparking devices in the respective cylinders, flexible conductors carried by the rods and leading to said sparking devices, a contact piece secured to each rod and connected with said conductor, and a stationary contact adapted to contact with each contact piece in succession in the rotation of said cylinders, substantially as described.

3. The combination of a stationary crank shaft, a rotating crank case thereon, cylinders secured to said crank casing, pistons in said cylinders, piston rods connected at their outer ends to said pistons and rotating at their inner ends about said crank shaft, inlet and outlet valves for the respective cylinders, levers for controlling said valves, rods for actuating said levers, cams for actuating said rods, means for rotating all of said cams in unison, sparking devices in the respective cylinders, flexible conductors carried by the rods and leading to said sparking devices, a contact piece secured to each rod and connected with said conductors, a stationarily supported arm, a rack adjustably secured in said arm, a device secured to said arm adjustably of the length of said device, and a contact carried by said device arranged to engage each contact piece in succession in the rotation of said cylinders.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ALIUS G. HATHCOCK.

Witnesses:
FRANCIS M. WRIGHT,
D. B. RICHARDS.